# Complete Summary

## GUIDELINE TITLE

Esotropia and exotropia.

## BIBLIOGRAPHIC SOURCE(S)

American Academy of Ophthalmology Pediatric Ophthalmology/Strabismus Panel. Esotropia and exotropia. San Francisco (CA): American Academy of Ophthalmology; 2007. 34 p. [166 references]

## GUIDELINE STATUS

This is the current release of the guideline.

It updates a previous version: American Academy of Ophthalmology Pediatric Ophthalmology Panel. Esotropia and exotropia. San Francisco (CA): American Academy of Ophthalmology; 2002 Oct. 30 p. [118 references]

All Preferred Practice Patterns are reviewed by their parent panel annually or earlier if developments warrant and updated accordingly. To ensure that all Preferred Practice Patterns are current, each is valid for 5 years from the "approved by" date unless superseded by a revision.

## COMPLETE SUMMARY CONTENT



## SCOPE

### DISEASE/CONDITION(S)

- Esotropia
- Exotropia

### GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Prevention
Treatment

## CLINICAL SPECIALTY

Family Practice
Ophthalmology
Pediatrics

## INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Health Plans
Nurses
Physician Assistants
Physicians

## GUIDELINE OBJECTIVE(S)

### Esotropia

To restore normal ocular alignment, thereby promoting development and preservation of binocular vision while addressing the following goals:

- Identify patients at risk for esotropia
- Detect esotropia
- Detect and treat amblyopia that may cause, or be caused by, esotropia
- Educate the patient and family/caregiver of the diagnosis, treatment options, and care plan
- Inform the patient's other health providers of the diagnosis and treatment plan
- Treat the esotropia (align the visual axes) in order to promote and maintain binocular vision (fusion, stereopsis), prevent or facilitate treatment of amblyopia, and restore normal appearance
- Limit the effects of amblyopia treatment on quality of life
- Lessen the effect of strabismus and amblyopia on employment and career choices
- Monitor vision and ocular alignment and modify therapy as appropriate

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To restore normal ocular alignment while addressing the following goals:

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- Limit the effects of amblyopia treatment on quality of life
- Lessen the effect of strabismus and amblyopia on employment and career choices
- Monitor vision and ocular alignment and modify therapy as appropriate

## TARGET POPULATION

- Individuals with childhood-onset esotropia
- Individuals with childhood-onset exotropia

## INTERVENTIONS AND PRACTICES CONSIDERED

### Esotropia

### Diagnosis

1. History
2. Examination including assessment of fixation pattern and visual acuity in each eye, ocular alignment and motility, extraocular muscle function, detection of nystagmus, sensory testing, cycloplegic retinoscopy/refraction, and fundoscopic examination

### Treatment/Management

1. Correction of refractive errors
2. Bifocals
3. Prism therapy
4. Amblyopia treatment
5. Extraocular muscle surgery
6. Follow-up evaluation
7. Counseling/referral

### Exotropia

### Diagnosis

1. History
2. Examination including assessment of fixation pattern and visual acuity in each eye, ocular alignment and motility, extraocular muscle function, detection of nystagmus, sensory testing, cycloplegic retinoscopy/refraction, and fundoscopic examination

### Treatment/Management

1. Correction of refractive status
2. Overcorrecting minus lens
3. Patching
4. Amblyopia treatment
5. Prism therapy
6. Convergence exercises for convergence insufficiency
7. Extraocular muscle surgery
8. Follow-up evaluation
9. Counseling/referral

### MAJOR OUTCOMES CONSIDERED

- Re-establishment of ocular alignment
- Promotion of binocular vision
- Promotion of stereopsis
- Restoration of normal oculofacial relationships

## METHODOLOGY

### METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

### DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

In the process of revising this document, a detailed literature search in Medline and the Cochrane Library for articles in the English language was conducted on the subject of esotropia and exotropia for the years 2001 to 2006.

### NUMBER OF SOURCE DOCUMENTS

Not stated

### METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

### RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

**Strength of Evidence Ratings**

**Level I**: Includes evidence obtained from at least one properly conducted, well-designed randomized controlled trial. It could include meta-analyses of randomized controlled trials.

**Level II**: Includes evidence obtained from the following:

- Well-designed controlled trials without randomization

- Well-designed cohort or case-control analytic studies, preferably from more than one center
- Multiple-time series with or without the intervention

**Level III**: Includes evidence obtained from one of the following:

- Descriptive studies
- Case reports
- Reports of expert committees/organization (e.g., Preferred Practice Patterns [PPP] panel consensus with external peer review)

## METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

## DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

## METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

## DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The results of a literature search on the subject of esotropia and exotropia were reviewed by the Pediatric Ophthalmology/Strabismus Panel and used to prepare the recommendations, which they rated in two ways. The panel first rated each recommendation according to its importance to the care process. This "importance to the care process" rating represents care that the panel thought would improve the quality of the patient´s care in a meaningful way. The panel also rated each recommendation on the strength of the evidence in the available literature to support the recommendation made.

## RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

### Ratings of Importance to Care Process

**Level A**, defined as most important

**Level B**, defined as moderately important

**Level C**, defined as relevant, but not critical

## COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

## METHOD OF GUIDELINE VALIDATION

Internal Peer Review

## DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

These guidelines were reviewed by Council and approved by the Board of Trustees of the American Academy of Ophthalmology (September 8, 2007).

# RECOMMENDATIONS

## MAJOR RECOMMENDATIONS

Ratings of importance to the care process (A-C) and ratings of strength of evidence (I-III) are defined at the end of the "Major Recommendations" field.

### Esotropia

### Diagnosis

The purpose of the comprehensive strabismus evaluation is to make the diagnosis, establish baseline status, and determine appropriate initial therapy. The possibility of restrictive, paralytic, or other neurologic causes (especially head trauma or increased intracranial pressure) for the strabismus should be considered. Because binocular vision can degrade rapidly in young children, resulting in suppression and anomalous retinal correspondence, early diagnosis and treatment are essential (Dickey & Scott, 1988; Fawcett, Leffler, & Birch, 2000; Wilson, Bluestein, & Parks, 1993).

The examination of a patient who has childhood-onset strabismus includes all components of the comprehensive pediatric or adult ophthalmic evaluation in addition to the sensory, motor, refractive, and accommodative functions (American Academy of Ophthalmology Pediatric Ophthalmology/Strabismus Panel, 2007; American Academy of Ophthalmology Preferred Practice Patterns Committee, 2005).

*History*

Although a thorough history generally includes the following items, the exact composition varies with the patient's particular problems and needs:

- Demographic data, [A:III] including identification of parent/caregiver, and patient's gender and date of birth
- Documentation of identity and relationship of historian [B:III]
- The identity of other pertinent health care providers [A:III]
- The chief complaint and reason for the eye evaluation [A:III], including date of onset and frequency of the ocular misalignment; which eye is deviated and in what direction; the presence or absence of diplopia, squinting, or other visual symptoms. Review of photographs of the patient may be helpful.

- Ocular history [A:III], including other eye problems, injuries, diseases, surgery, and treatments (including eyeglasses and/or amblyopia therapy)
- Systemic history; birth weight; prenatal and perinatal history that may be pertinent (e.g., alcohol, drug, and tobacco use during pregnancy); past hospitalizations and operations; general health and development [A:III]
- Pertinent review of systems, [B:III] including history of head trauma and relevant systemic diseases
- Family and social history [A:III], including eye conditions (strabismus, amblyopia, type of glasses and history of wear, extraocular muscle surgery or other eye surgery, and genetic diseases)
- Current medications and allergies [A:III]

*Examination*

The comprehensive strabismus examination should include the following elements:

- Assessment of fixation pattern and visual acuity in each eye [A:III]
- Ocular alignment and motility at distance and near [A:III]
- Extraocular muscle function (ductions and versions including incomitance, such as A and V patterns) [A:III]
- Detection of nystagmus [A:III]
- Sensory testing [A:III]
- Cycloplegic retinoscopy/refraction [A:III]
- Fundoscopic examination [A:III]

Documentation of the child's level of cooperation with the examination can be useful in interpreting the results and in making comparisons between examinations.

**Management**

All forms of esotropia should be considered for treatment. [A:III] Ocular alignment should be established as soon as possible, especially in young children, to maximize binocularity (Bateman, Parks, & Wheeler, "Discriminant analysis of congenital esotropia surgery," 1983; Birch et al., 2004), prevent or facilitate treatment of amblyopia (Dickey et al., 1991; Sperduto et al., 1983), and normalize appearance. [A:III] In almost all cases, clinically important refractive errors should be corrected. [A:III] Amblyopia treatment is usually started before surgery, because this may reduce the angle of strabismus (Koc et al.,2006) or increase the likelihood of good postoperative binocularity (Birch et al., 2004; Weakley & Holland, 1997) [A:III]

*Choice of Therapy*

The following treatment modalities are used alone or in combination as required to achieve the therapeutic goal:

- Correction of refractive errors (Pediatric Eye Disease Investigator Group, 2002) [A:I]
- Bifocals (Ludwig, Parks, & Getson, 1989) [A:II]

- Prism therapy (Repka, Connett, & Scott, 1996; "Efficacy of prism adaptation," 1990) [A:II]
- Amblyopia treatment (Weakley & Holland, 1997) [A:III]
- Extraocular muscle surgery (Bateman, Parks, & Wheeler, "Discriminant analysis of acquired esotropia surgery," 1983) [A:III]

Treatment plans are formulated in consultation with the patient and parent/caregiver. The plans should be responsive to their expectations and preferences [A:III], including the family's/caregiver's perception of the existing alignment, which may differ from the ophthalmologist's, and what they hope to achieve with treatment. It is important that the family/caregiver and ophthalmologist agree on the goals of treatment before surgery is performed.

*Follow-up Evaluation*

Even when initial treatment results in good ocular alignment, follow-up is essential, since the child remains at high risk for developing amblyopia, losing binocular vision, and having a recurrence of strabismus. Until visual maturity is reached, periodic evaluations are necessary (Bhola et al., 2006). [A:II] During the teenage years, and if the examination has been stable, follow-up evaluations are appropriate every 1 to 2 years thereafter (Scheiman et al., 2005). [A:I] New or changing findings may indicate the need for more frequent follow-up examinations.

**Counseling and Referral**

Childhood esotropia is a long-term problem that requires commitment from the parent/caregiver and ophthalmologist to achieve the best possible outcome.

The ophthalmologist should discuss the findings of the evaluation with the patient, when appropriate, as well as with the parent/caregiver. The ophthalmologist should explain the disorder and recruit the family in a collaborative approach to therapy. [A:III] Parents/caregivers of pediatric patients who understand the diagnosis and rationale for treatment are more likely to adhere to treatment recommendations (Newsham, 2002; Norman et al., 2003).

**Exotropia**

**Diagnosis**

The purpose of the comprehensive strabismus evaluation is to make the diagnosis, establish baseline status, inform the family/caregiver, and determine appropriate therapy. The possibility of restrictive, paralytic, or other neurologic causes (especially head trauma or increased intracranial pressure) for the strabismus should be considered.

The examination of a patient who has childhood-onset strabismus includes all components of the comprehensive pediatric or adult ophthalmic evaluation in addition to the sensory, motor, refractive, and accommodative functions (American Academy of Ophthalmology Pediatric Ophthalmology/Strabismus Panel,

2007; American Academy of Ophthalmology Preferred Practice Patterns Committee, 2005)

*History*

Although a thorough history generally includes the following items, the exact composition varies with the patient's particular problems and needs.

- Demographic data [A:III], including identification of parent/caregiver, and patient's gender and date of birth
- Documentation of identity and relationship of historian [B:III]
- The identity of other pertinent health care providers [A:III]
- The chief complaint and reason for the eye evaluation, [A:III] including date of onset and frequency of the ocular misalignment; which eye is deviated and in what direction; the presence or absence of diplopia, squinting, or other visual symptoms. Review of photographs of the patient may be helpful.
- Ocular history, [A:III] including other eye problems, injuries, diseases, surgery, and treatments (including eyeglasses and/or amblyopia therapy)
- Systemic history; birth weight; prenatal and perinatal history that may be pertinent (e.g., alcohol, drug, and tobacco use during pregnancy); past hospitalizations and operations; general health and development [A:III]
- Pertinent review of systems, [B:III] including history of head trauma and relevant systemic diseases
- Family and social history, [A:III] including eye conditions (strabismus, amblyopia, type of glasses and history of wear, extraocular muscle surgery or other eye surgery, and genetic diseases)
- Current medications and allergies [A:III]

*Examination*

The comprehensive strabismus examination should include the following elements:

- Assessment of fixation pattern and visual acuity in each eye [A:III]
- Ocular alignment and motility at distance and near [A:III]
- Extraocular muscle function (ductions and versions including incomitance, such as A and V patterns) [A:III]
- Detection of nystagmus [A:III]
- Sensory testing [A:III]
- Cycloplegic retinoscopy/refraction [A:III]
- Funduscopic examination [A:III]

Documentation of the child's level of cooperation with the examination can be useful in interpreting the results and in making comparisons between examinations.

**Management**

All forms of exotropia should be considered for treatment. [A:III] In most cases, ocular alignment should be re-established as soon as possible, especially in young children, if the deviation is manifest a large percentage of the time. [A:III]

However, the optimal modes of therapy for exotropia, the long-term benefit of early surgical correction, and the superiority of bilateral versus unilateral surgery are not well established (Hatt & Gnanaraj, 2006). Amblyopia is uncommon in patients with intermittent exotropia, but it should be treated if present. [A:III]

*Choice of Therapy*

The following treatment modalities may be used alone or in combination as required to achieve the therapeutic goal:

- Correcting refractive errors [A:III]
- Overcorrecting minus lenses [A:III]
- Patching (antisuppression therapy) [A:III]
- Amblyopia treatment [A:III]
- Prism therapy [A:III]
- Convergence exercises for convergence insufficiency [A:III]
- Extraocular muscle surgery [A:III]

*Follow-up Evaluation*

Children with exotropia require follow-up evaluations to monitor the magnitude and frequency of the deviation, visual acuity, and binocularity. The frequency of the follow-up evaluations is based on the age of the child, the ability to obtain an accurate visual acuity, and the control of the deviation. Yearly examinations are appropriate until visual maturity is reached, but they may be reduced in frequency thereafter if the strabismus has been stable. [A:III]

Follow-up evaluation includes interval history, tolerance to treatment (if any), and routine examination and testing of ocular motility.

**Counseling and Referral**

The ophthalmologist should discuss the findings of the evaluation with the patient, if appropriate, as well as the parent/caregiver. The ophthalmologist should explain the disorder and recruit the family in a collaborative approach to therapy. [A:III] Parents/caregivers of pediatric patients who understand the diagnosis and rationale for treatment are more likely to adhere to treatment recommendations (Newsham, 2002; Norman et al., 2003).

**Table. Follow-up Eye Examination Guidelines for Children with Esotropia and Exotropia [A:III]**

| Age | Interval |
|---|---|
| 0-1 year | 3-6 months |
| 1-5 years | 6-12 months |

| Age | Interval |
| --- | --- |
| 5 years | 12-24 months |

**Note**: More frequent visits may be necessary if amblyopia is present (see the National Guideline Clearinghouse (NGC) summary of the American Academy of Ophthalmology guideline Amblyopia), if patching therapy is being administered, or if there is a recent deterioration of alignment.

**Definitions**:

**Ratings of Importance to the Care Process**

**Level A**, defined as most important

**Level B**, defined as moderately important

**Level C**, defined as relevant but not critical

**Ratings of Strength of Evidence**

**Level I**: Includes evidence obtained from at least one properly conducted, well-designed randomized controlled trial. It could include meta-analyses of randomized controlled trials.

**Level II**: Includes evidence obtained from the following:

- Well-designed controlled trials without randomization
- Well-designed cohort or case-control analytic studies, preferably from more than one center
- Multiple-time series with or without the intervention

**Level III**: Includes evidence obtained from one of the following:

- Descriptive studies
- Case reports
- Reports of expert committees/organization (e.g., Preferred Practice Patterns [PPP] Panel consensus with external peer review)

## CLINICAL ALGORITHM(S)

None provided

## EVIDENCE SUPPORTING THE RECOMMENDATIONS

### REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for selected recommendations (see "Major Recommendations").

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

#### Esotropia

The potential benefits of treatment for esotropia include promoting binocular vision and normal visual acuity in each eye. If binocularity is achieved, the number of surgical procedures over a lifetime and overall cost to society may be reduced. Fusion and stereopsis are necessary for some careers and may be useful in others as well as in athletic activities and activities of daily life. In addition, ocular alignment at any age enhances social interactions by normalizing appearance as well as eye contact. Normal ocular alignment is important for the development of a positive self-image and social eye contact.

#### Exotropia

The potential benefits of treatment for exotropia include promoting binocular vision and normal visual function in each eye. The importance of normal ocular alignment on the development of a positive self-image should not be underestimated; the appearance of misaligned eyes impairs self-image and social interactions and may reduce employment opportunities.

### POTENTIAL HARMS

#### Esotropia

- Disadvantages of bifocals include expense, appearance, and potential rejection by the child.
- Press-on prisms cause visual symptoms that some children find objectionable, are costly, require re-evaluation (additional office visits), and may be unacceptable in children not otherwise wearing eyeglasses.

#### Exotropia

- Overcorrecting minus lens therapy may not be well tolerated visually by some young patients.
- Prolonged use of prisms may cause an undesirable reduction in fusional convergence amplitudes.

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

- **Preferred Practice Patterns provide guidance for the pattern of practice, not for the care of a particular individual.** While they should generally meet the needs of most patients, they cannot possibly best meet the needs of all patients. Adherence to these Preferred Practice Patterns will not ensure a successful outcome in every situation. These practice patterns should not be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed at obtaining the best results. It may be necessary to approach different patients´ needs in different ways. The physician must make the ultimate judgment about the propriety of the care of a particular patient in light of all of the circumstances presented by that patient. The American Academy of Ophthalmology is available to assist members in resolving ethical dilemmas that arise in the course of ophthalmic practice.
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- References to certain drugs, instruments, and other products are made for illustrative purposes only and are not intended to constitute an endorsement of such. Such material may include information on applications that are not considered community standard, that reflect indications not included in approved Food and Drug Administration (FDA) labeling, or that are approved for use only in restricted research settings. The FDA has stated that it is the responsibility of the physician to determine the FDA status of each drug or device he or she wishes to use, and to use them with appropriate patient consent in compliance with applicable law.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

### IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads
Quick Reference Guides/Physician Guides

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better
Living with Illness

### IOM DOMAIN

Effectiveness
Patient-centeredness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

American Academy of Ophthalmology Pediatric Ophthalmology/Strabismus Panel. Esotropia and exotropia. San Francisco (CA): American Academy of Ophthalmology; 2007. 34 p. [166 references]

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

1992 Feb (revised 2007 Sep)

### GUIDELINE DEVELOPER(S)

American Academy of Ophthalmology - Medical Specialty Society

### SOURCE(S) OF FUNDING

American Academy of Ophthalmology without commercial support

### GUIDELINE COMMITTEE

Pediatric Ophthalmology/Strabismus Panel; Preferred Practice Patterns Committee

### COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

*Members of the Pediatric Ophthalmology/Strabismus Panel*: Linda M. Christmann, MD, Chair; Patrick J. Droste, MD; Sheryl M. Handler, MD, American Association for Pediatric Ophthalmology and Strabismus Representative; Richard A. Saunders, MD; R. Grey Weaver, Jr., MD; Susannah G. Rowe, MD, MPH, Methodologist; Norman Harbaugh, MD, FAAP, American Academy of Pediatrics Representative; Donya A. Powers, MD, American Academy of Family Physicians Representative

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### FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

This author has disclosed the following financial relationships from January 2006 to August 2007:

Norman Harbaugh, MD, FAAP: Kids First – Grant support. Kids Time – Equity owner. Medimmune – Lecture fees. Centers for Disease Control, Merck, United Healthcare – Consultant/Advisor.

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## GUIDELINE AVAILABILITY

Electronic copies: Available from the American Academy of Ophthalmology (AAO) Web site.

Print copies: Available from American Academy of Ophthalmology, P.O. Box 7424, San Francisco, CA 94120-7424; telephone, (415) 561-8540.

## AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Summary benchmarks for preferred practice patterns. San Francisco (CA): American Academy of Ophthalmology; 2007 Nov. 22 p.

Available in Portable Document Format (PDF) and as a Personal Digital Assistant (PDA) download from the American Academy of Ophthalmology (AAO) Web site.

Print copies: Available from American Academy of Ophthalmology, P.O. Box 7424, San Francisco, CA 94120-7424; telephone, (415) 561-8540.

## PATIENT RESOURCES

None available

## NGC STATUS

This summary was completed by ECRI on December 1, 1998. The information was verified by the guideline developer on January 11, 1999. This summary was updated on March 12, 2003. The updated information was verified by the guideline developer on April 2, 2003. This NGC summary was updated by ECRI Institute on February 5, 2008. The updated information was verified by the guideline developer on February 27, 2008.

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